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OUR STEAM RAILROADS

AND

SUBURBAN TRAVEL.

BY

MR. CHARLES W. FELT,

NORTHBOROUGH, MASS.

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1. Catalogue of English High School, and Account of Re-union. (60 pages, illustrated.) Salem, Mass., 1857.
2. Why do not Women make Greater Use of the Free Libraries?[1] Manchester, England, 1870.
3. Free Labor the First Condition of Free Trade.[1] (Stereotyped.) Manchester, England, 1870.
4. Co-Operation Criticised.[1] Manchester, England, 1871.
5. The Eastern Railroad of Massachusetts, U.S.A.: Its Blunders, Mismanagement, and Corruption.[1] Liverpool, England, 1873.
6. Protest against the Action of the Railway Committee of the Massachusetts Legislature of 1874, in Relation to the Crossing by the Eastern Railroad of the State Prison Grounds at Charlestown.[1] Boston, 1874.
7. The Eastern Railroad, etc., No. 2. Boston, 1874.
8. The Dead-Heads; or, Who Ride Free on the Railroads? No. 1. Boston: Rand, Avery, & Co., 1875.
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10. Political Deadheads. Boston, 1875.
11. Centennial Deadheads.[1] Boston, 1876.
12. Butler among his Constituents.[1] Boston, 1876.
13. Butler among his Farmer, Mechanic, and Laborer Constituents. Northborough: *Farmer* Offices, 1878.
14. Nuts for Butler to Crack. (Stereotyped.) Boston, 1879.
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[1] Out of print.

OUR STEAM-RAILROADS.

In October, 1872, I landed at Quebec after a four-years residence in England; and one of the first things to attract my attention at Point Levi was a printed notice of the Boston and Maine Railroad, bearing the name of Payson Tucker — tangible evidence of the war then raging between the Eastern and Boston and Maine railroads. I had heard some of John Bull's criticisms of American railways, and during a short visit home (which I then supposed I was making) I meant to indulge in plain talk. Moreover, I had formed the idea that the best pathway from the United States to Europe lay through Canada, rather than through ocean "lanes" drawn parallel to its shores.

Family changes kept me in America; and I soon found myself drawn into this railroad war, which culminated, so far as I was concerned, in a pamphlet entitled "The Eastern Railroad of Massachusetts: Its Blunders, Mismanagement, and Corruption," issued just prior to the panic of 1873; and a few months later I sold my interest in the company at seventy-eight dollars per share. I soon found that other railroad companies were suffering from abuses, the most conspicuous of which, in a general way, was that of the large number of free passes; and in 1875-76 I issued, under the patronage of the leading railroads of New England, a series of four pamphlets exposing the abuses of that system.

At this time there is no need of more than mentioning that there may still be faint traces of "blunders, mismanagement, and corruption" on some of our railroads; for have we not a governor who in special messages or future inaugurals or "investigations" will minutely detail the circumstances? Therefore I hope it will be considered proper for me to devote this pamphlet to the more agreeable task of discovering, if we may, new paths of usefulness for this yet new invention, the steam-railroad. This is the more proper, because the two New England railroad companies which have been the most conspicuous sufferers — the Eastern, and what is now the New York and New England — have made great improvements, and it is hoped are rapidly advancing towards careers of permanent prosperity.

Fast Mail Trains.

One of our Massachusetts newspapers complained that in my pamphlet of 1873, I mentioned a possible connection of the Eastern Railroad with ocean steamers. But, as the Eastern Railroad has long maintained connection with steamers to various parts of Maine and the foreign territory beyond, we may assume its close connection with Atlantic steamers at no distant day. At this time the post-office authorities and the public are so far interested in fast mail trains, that handsome appropriations have been

made by Congress, and experimental trains have been run on the Pennsylvania and New York Central railroads. Now, will not all interested, and especially those Boston merchants who want a permanent fast mail between Boston and New York, admit that the "smooth handle" to this question is to be found in the foreign mail? The whole country can be interested in a fast daily mail, say from San Francisco and New Orleans to London. This with a few ramifications will give a splendid system of fast mails for the United States and Canada. But where should such a mail take the steamer? The American mail from London takes the steamer at Queenstown after a journey by express trains (the limited mail) across England, Wales, and Ireland, and by fast steamer from Holyhead to Dublin. Should not the English mail from the United States and Canada take the steamer at the most eastern point of the continent on the route? This is White Haven, Nova Scotia, a most desirable harbor. It is not connected by railroad, and for the present Halifax must be substituted; but ultimately by means of a fast steamer to Newfoundland, and a railroad across that island, St. John's (which is as far beyond Halifax, as Halifax is from New York, and more than one-third the distance from New York to London) should be the point of transfer of the mails to the steamship. This route to-day (from New York to Halifax), calls for a fast daily mail train, more than any other in the United States; and when established, it will soon call loudly for extension to all the chief cities. A fast daily European mail flying across New England at sixty miles an hour could not fail to stimulate the service between Boston and New York, and permanently secure for it the highest efficiency. We trust the fast train just established between Boston and St. John, New Brunswick, which (apart from the time consumed in stops) averages thirty-three miles an hour, is an important step towards a fast-mail service in New England. If this fast train can be extended to Halifax, it will be easy to interest some line of Atlantic steamers, and make an experiment which must be continued until the whole European mail passes by rail through New England.

Four Per Cent Interest for Money.

It may be taken as a safe general rule, that, "the greater the interest, the poorer the security." Now that the flush times of the war are over, there is a general demand for lower prices; and the price demanded for the use of money has steadily decreased where the security is undoubted. The United States Government hires money at three per cent, or about half the rate paid before the war. Any little town can hire money at four per cent, and why is it that our railroads cannot borrow on the same terms? It is rumored that the managers of the New York Central Railroad contemplate issuing four per cent bonds, and a few roads have already placed such securities on the market at fair rates. This is a subject of prime importance, for every business man requiring large capital knows that his success depends upon maintaining his credit so high that he can buy and borrow at the lowest rates. The American railways were built cheaply, and their value has been greatly increased by many comparatively small outlays year by year, so that now they are very much

more valuable than when built, from *actual cost*, as well as from the natural increase in value as population increases; and this should be taken into account when complaints of "watered stock" are made. But the time is coming, and in many cases it has come, when very large additional outlays must be made. New stations and equipment; double tracks or four tracks and steel rails; straightening curves and reducing steep grades; new branches, sidings, and extensions; avoiding road crossings by bridging the railroad (securing full twenty feet in the clear, and more if possible, at all bridges) or by elevating or depressing the railroad itself for short distances; and generally improving the quality of the permanent way, — all will cost a great deal of money. In Europe, the expense for renewals was largely avoided by thorough building at first, a policy practicable and undoubtedly cheaper in the end for them, but impossible with us with our high rates of interest, comparatively sparse population, and withal our headlong impetuosity. But now we have got to meet the difficulty. Shall the money needed be provided by earnings, by borrowing, or by increasing the number of shares? If money can be borrowed at four per cent, that is clearly the best method; and a sinking fund may be provided, say of one-half of one per cent per annum, making the loan a very long one. This would in effect be paying for improvements from the earnings of the next century, or in reality making the improvements pay for themselves. It is a sound policy to regard the shareholders as furnishing the active capital and taking the risks of the business, usually earning good dividends; while the bondholders furnish the invested capital, and draw a low rate of interest on a secured investment; and the public is assured of low rates of fare and freight, because ample capital will give the best possible facilities for business.

It is undoubtedly true that a railroad manager can profitably employ about twice the money at four per cent as at six per cent. But it may be asked, are railroad bonds as good security as the best real estate? The bonds of good railroads should be quite as good as mortgages on good real estate, and if necessary for security we should make closer relations between the railroads and the State. Good roads are an essential element of civilization. The security of government cannot be maintained without them; as is seen in the three southern peninsulas of Europe, — the Spanish, Italian, and Greek, — for the brigand is only found in districts where good roads are wanting.

In 1853 as well as 1873, the Eastern Railroad shareholders were in distress; and in the former year it was not uncommon to hear it said that trust funds, or funds of dependent persons, should not be invested in railroads. That may have been wisdom at that time and place, but is it sound doctrine? If the money invested in the great highways of a nation cannot be depended upon to yield a regular revenue after a few years of good management, it is pertinent to inquire, What investments can we depend upon? It may be worth while to consider at this time, whether we may not gradually take one step forward by allowing towns and cities; or, as that policy may be questioned, why may not the State aid established railroad companies in getting money at low rates of interest, on condition of an equivalent advantage to the public? It has been

customary to grant powers to towns and cities to help poor railroads, where loss is almost inevitable; and would it not be well for such help to be extended to strong railroads, where a great gain to the public is sure to be realized? Recently the Boston and Albany, and New York and New England Railroads have severed connections with the State, which they had outgrown; but it does not follow that higher relations, that will furnish increased capital at the same low rates that the State pays, is not highly desirable. Much has been said about the relation of railroads to the State. But can we not gain some light on the question by considering the relation of horse-railroads to the cities? Towns and cities furnish horse-railroads with the highway, and even widen streets for their accommodation, but hold certain control in regulating fares. Might not the public credit be loaned to our established railways, to the amount of their value as highways, that they may have money at low rates of interest for improvements the public demands, on condition that fares are reduced?

Suburban Passenger Travel.

Some have argued that rates for freight are more important than passenger fares, because everybody is compelled to pay freight as an important item in the cost of food, while comparatively few spend much money for passenger fares. This problem will do very well for a debating society; but it is so large a question that we may perhaps take one branch, viz., suburban passenger fares, as that provokes comparison between the two systems of horse and steam railroads. A steam-railroad differs from a common road in three principal features: —

First, A smooth and nearly straight hard iron rail, on which a horse can draw six times as much as on a good common road.

Second, A level or nearly level road.

Third, Steam-power.

The horse-railroads have not the advantage of the third feature, though they may have it, as they have the other two features, in an imperfect degree as compared with the steam-railroads. It should be noticed that some of our great railroads first employed horse-power: therefore a horse-railroad really is a primitive steam-railroad.

It has been a question, whether the short local travel near to cities should not be abandoned to the horse-railroads; but of late steam-railroad managers have been led to see that this business was well worth their attention, and their patrons have been quite earnest to be carried at lower rates, and to secure on steam-railroads all the advantages of the horse-railroads. They want to know why, if city horse-railroads, with two men and two (sometimes three or four) horses to each small car, can pay eight per cent dividends by carrying passengers on a line five miles long for five cents, steam-railroads, with not more than one man for each long car, and coal at five dollars per ton against hay and grain at twenty-five dollars, should not carry passengers twice the distance for the same money The plain answer is, that it can be done if the amount of travel is sufficient.

The uniform result of reductions in postage has been a marvellous

increase of mail matter, which in a few years has yielded more money than the previous higher rates; and the low price of newspapers has produced the immense circulation of the large dailies; and without doubt low railway fares will produce a corresponding increase. Indeed, the horse-railroads furnish the most gratifying evidences of this. Their low rates have built up an enormous business; and if the cars moved faster, the business would be vastly greater. To-day suburban passengers are willing to pay steam-railroads higher fares, notwithstanding they are delivered no nearer the centre than Kneeland or Causeway streets. But the post-office department has the government at its back to supply the loss while the experiment is being tried, and newspapers have an advertising patronage which immediately responds to any evidence of increasing circulation; while a railroad manager has interest to pay, and dividends, which, should they fail, he would cease to be manager. The public persists in regarding railroad companies as possessing unlimited wealth; while the truth is that the most favored would be bankrupt in a year if vigilant watch of the treasury were relaxed, and usually, in railroad as in household economy, it is no ordinary struggle "to make both ends meet." Therefore it is quite impossible for the managers of these private companies to take great risks, even for a short period and with a good prospect of return. Most of the investors in railroads are as dependent upon their interest and dividends as the depositors in a savings bank.

Suburban patrons of our steam-railroads should remember that if they want low fares they must do something besides asking for them. They should be prepared to show that there is enough travel to warrant a reduction, and that interest enough is taken by that portion of the great public immediately concerned to secure the steady and regular increase of traffic upon which such reduction should be based. There should be a willingness also to take a "standing seat" occasionally, as in the horse-cars, for short distances. Indeed, it would be a good plan to provide suburban cars with plenty of inside standing-room, — a great convenience in case of a rush of travel. About thirty years ago, when the New-York Central Railroad was organized by the union of ten short railroads, a uniform two-cent per mile rate was adopted But greater experience shows that the rates nearer the cities should be lower than at great distances, and because the vastly greater travel of the cities will admit of this after paying the greater expenses of such traffic. It is found practically that for short distances, say within five or ten miles, the fare paid for a part of the trip must be the same as for the whole distance. This is true of season-tickets for longer distances, say about fifty miles. In other words, long railroads must be operated in divisions, with the lowest fares where there is the largest travel. Some of the steam-railroads are making five-cent fares for five miles out of Boston, and to what distance this may be extended is something that time alone can determine. The Revere-Beach Railroad was operated for several weeks last year at a fare of five cents from Boston to Lynn, — ten miles. This arose from a contest, happily ended, and now the fares are higher. An examination shows that even for so long a distance as ten miles, five-cent fares may in this case, at some time, be established. This arises to some extent from the

peculiar advantages of that railroad in its large beach travel. Five-cent fares would be profitable now between Boston and Lynn if one line could have all the traffic. But Lynn people enjoy seventy-eight trains each way daily, and thirty-eight Sunday trains, to and from Boston, on the two railroads; and have five distinct methods of reaching Boston, supplied by private capital, and all in operation to-day: —

First, The Boston and Salem turnpike, now a common road.

Second, The Eastern Railroad.

Third, The Saugus Branch, now a part of the Eastern Railroad, but originally connected with the Boston and Maine Railroad.

Fourth, The Lynn and Boston Horse Railroad.

Fifth, The Boston, Revere Beach, and Lynn Railroad (narrow gauge).

All these means of transportation were supplied in answer to urgent demands at the time, and not one of them could now be dispensed with. Even the horse-railroad renders important service to a considerable class of passengers who do not value the time consumed by ten miles of travel at the speed of a stage-coach so much as the convenience of reaching central or convenient points along the route, both in Lynn and Boston. But the facts in this case serve to show, that when, through dissatisfaction, the citizens of a town clamor for a new line, they are clamoring for a new line to support. This the people of Hyde Park will do well to bear in mind. They now have about fifty trains a day each way on two railroads, and ten-cent fares for a distance of seven and one-half miles. Yet some are not satisfied, and say they want an elevated railroad.

So great a reduction as five cents for ten miles would have a powerful influence upon local interests. It would have a tendency to "kill trade," and also to increase the population of towns and cities favored with low rates. It would seem as though there were two opposing interests: that of the shopkeepers and real-estate men, more especially those of the latter class interested in outlying property. But there is no actual antagonism. Towns and cities already favored with five-cent fares to Boston have good stores, and increase steadily in wealth and population. An enterprising trader can usually hold his local customers, and defy distant competition. Increase of population benefits alike the shopkeeper and the property owner, whether his property is near the centre or more remote, — the more valuable property increasing more slowly but more surely. There is, however, great loss to the shopkeepers consequent upon sudden and extreme changes. Gradual and steady decline of fares to the minimum as population increases (and the population of towns favored with good railroad facilities and low fares is sure to increase) tends to secure the greatest advantage to all concerned. Undoubtedly we may look for an extension of the system of low fares for a few years till a minimum is established to Quincy, on the Old Colony; Hyde Park, on the Providence and New York and New England; all the Newtons, on the "Newton Circuit" of the Albany; to Waltham, on the Fitchburg and Massachusetts Central; to Woburn, on the Lowell; Wakefield or Reading, on the Boston and Maine; and Lynn, on the Eastern. Lynn is the most important of these suggested termini of the low-fare system, being one of the large cities of the Commonwealth. Newton is pressing

close behind, being, like Brooklyn, N.Y., a city closely adjacent to the metropolis; and it will soon have the advantage of a "circuit" railway. (The Brookline branch will be extended to meet the Newton Lower Falls branch, so that a train may *start from Boston and return* on one continuous line.) Waltham and Woburn will soon be cities; and the time is not far off when Quincy, Hyde Park, and Wakefield will want city charters. It is not unlikely that "circuit" railways will soon be popular within ten or twenty miles of Boston.

The effect of such changes must be felt farther and materially where large cities are not far beyond these limits. But towns beyond, which want to participate in suburban advantages, or say those within an hour's ride or thirty miles of Boston, must bestir themselves and offer real advantages to attract new-comers; and cast off the old ways of stealing away capitalists from the city with bribes of under-valuation, and low taxes secured by meanness and parsimony if not actual complicity with frauds. It is to be hoped that the time is not far in the future when the citizens of our inland towns enjoying the advantages of railroads will unite in developing practicable schemes to secure stations within their limits, not more than one mile apart, surrounded by prosperous farm or manufacturing villages. A railroad, like a river, should dispense its blessings all along the line. We must make one continuous garden along all our New-England railways, as far surpassing that bordering the European lines as that garden surpasses ours to-day.

Boston Tunnel.

As the various railroads centring in Boston made some years ago the Grand Junction Railroad outside of the city, and, more recently, the Union Railroad within the city, a necessity for freight, it is probable that the time is not distant when some similar connection of the railroads within the city for passengers will become an even more imperative necessity. When the Eastern Railroad was built in 1838, it was found necessary to tunnel Salem and Newburyport, for they were way-stations. To-day Boston is but a way-station in the great thoroughfares of the nation, and it must be tunnelled. If our steam-railroads are to continue to cater extensively for suburban traffic at low fares, they must also furnish better facilities in Boston. Solid columns of passengers will not always be content to cross the Common on foot from the Providence station, or come up from the Albany and Old Colony stations on Kneeland Street, or from the Lowell, Eastern, and Fitchburg stations on Causeway Street. The Revere Beach station is a trifle nearer the business centre; but even the New York and New England and the Boston and Maine stations are central only for certain interests, and many of their patrons have long distances to travel after arriving in Boston. The simplest remedy would appear to be to make a tunnel from the northern to the southern stations to be used by all the railroads. The route of such a tunnel will be a matter of much interest. Some would have it under Washington Street; but we would suggest that it be between Washington and Tremont streets, and that a new safety invention for

elevators be employed, by which the well is curved till it becomes a horizontal way in which the speed in case of a fall may be gradually but rapidly checked. This horizontal way should terminate in the nearest station, of which there should be many, so that passengers may step from the train (at the proper station) into the elevator-car of any principal building on Washington or Tremont streets. As the Metropolitan Underground Railway of London, now many miles long, is offensive because of smoke, it may be well to propel the trains through Boston Tunnel by wire cables and stationary engines. For instance, trains from the northern railroads could pass through the tunnel to the Boston and Albany Railroad, and there be attached to a waiting locomotive, and taken, say, over the Newton circuit, and returned without change to the tunnel to meet at the other end a waiting locomotive, and perhaps go over another "circuit" on some of the northern roads.

This will be no addition, but rather a reduction, of the distance travelled by trains at present; for after each train has discharged its passengers in a terminal station in Boston it is "shifted," or taken to some siding a mile or two away, there to remain till it is wanted again. But the engine returns, making double duty for the machine. This is a "shifting" engine. The engine of the train is taken to the "roundhouse," also a mile or more distant; making no less than six trips of an engine for each time a train arrives and departs from a station in Boston. Besides this, there is more or less "switching" in getting the train upon the proper track, and in "making up trains," some of which is done over grade-crossings; the whole making an amount of running of engines and using of tracks which is perfectly formidable. These extra duties amount to about *one-fifth* of the whole duty performed by locomotives, and by far the most laborious and expensive portion of their duty. A small part of this extra duty, employed to better advantage, would give passengers all the accommodation of the Boston Tunnel. It may be objected, that it is not desirable to have railway trains running so close to valuable property even at a lower level than the street; but we find superior structures already built and building along the depressed lines on Back Bay and up to the Providence and Albany depots.[1]

The idea of a tunnel through Boston, though original with the writer, has also been suggested independently in a circular by Mr. Charles E. French of Boston, and also by "Blaxton" among other suggestions in his letters to "The Transcript;" and, doubtless, the idea has occurred to many others.

Grade-Crossings.

The plan of tunnelling Boston, and connecting the various railroads on the north and east of the city, affects the subject of the grade-crossings of those railroads, and also that of the Albany and Providence railroads. It will be confessed that this is a complicated matter. But three simple facts may be gathered from the Railroad Commissioner's late report on the subject: —

[1] A recent despatch from Vienna states that "an imperial concession has been granted to a firm of English contractors for a railway by which all the Vienna railways will be united by branch lines and a circular railway."

First, That grade-crossings for freight must be permitted, at least for the present.

Second, That passenger trains should not be permitted to cross other tracks at grade.

Third, In order to secure this last result at the northern crossings, passenger-trains must be assigned a higher or lower level than at present.

With the Boston Tunnel these conditions could be applied at the Albany and Providence crossing. Incoming trains on both the Albany and Providence roads would pass through the tunnel and across the city, with stations at every street, and return through or near the present Providence station, and pass out on their respective roads. The tunnel would connect with each road by a Y; the trains entering by one arm of the Y and leaving by the other. This system diminishes the importance of one great terminal station for each road, and supplies instead a number of union stations along the tunnel. It is as if the horse-railroads should build stations at the various street-corners, and the cars of all the lines should stop at them; or be practically as it is now on Tremont Street between Boylston and Summer streets, where the cars of all the companies stop only at the street-corners.

When the London Metropolitan Underground Railway was building in 1861, and the streets were filled with huge piles of the excavated dirt, and long rows of buildings were supported with heavy shores awaiting the slow dissolution of injunctions and other legal and financial difficulties, "The Times" suggested that it was a great job to build the railway, but a greater job to get the money to do it with. It is idle to waste words upon this subject, unless there is some available method of reducing the scheme to practice. The abolition of grade-crossings is of itself a sufficient inducement to lead to the use of tunnels. If the Boston and Maine Railroad can afford to build an elevated railroad from Mystic River to Haymarket Square, it can much better afford to tunnel the same distance. And if the Eastern and Boston and Maine railroads are united, and run all their passenger-trains through a tunnel from Somerville, the "grade-crossings" are mostly obviated. If Charles River is tunnelled for the railroads, it obviates such a predicament as the Old Colony met a few months since with a schooner stuck fast for several hours in the Boston draw. Another great step towards abolishing grade-crossings may be taken by allowing the Fitchburg passenger-trains to pass over the Massachusetts Central track, and use the Lowell depot for a few years. This would avoid crossing the Eastern and Boston and Maine tracks. Indeed, the Lowell and Fitchburg railroads might use one track permanently for passenger business from Somerville to the Boston Tunnel.

It may be suggested that the Boston Tunnel would be a blow at the proposed

Elevated Railroads in Boston.

It is rather a natural and proper, and perhaps inevitable, extension of the present railway system. There is already ample provision for union of railroads, both within and without the city, for freight; and suitable provision for passengers must come about sooner or later. The Boston

Tunnel should be near enough to the Post Office to provide for quick and ready delivery of the mails as well. The Boston Tunnel would merely be an evidence that the steam-railroads are disposed to protect their suburban travel, and provide the best possible delivery of all their patrons in the city. This was the idea at first of the New York elevated roads, and it was expected that the Pullman trains would go to Wall Street; but it was soon found to be impossible, for the city travel monopolized the road. But such an arrangement is possible and very desirable in Boston. The Boston Tunnel certainly has a special bearing on the question of elevated railroads in Cambridge, for such railroads could make easy connection with the Fitchburg Railroad; and the tunnel will give the necessary Boston accommodation, the lack of which made the former Cambridge or Harvard branch of the Fitchburg Railroad a failure.

Would the Boston Tunnel interfere with the

Horse-Railroads?

The horse-cars would continue in the streets as now, and the convenience of getting into and out of them is so great that they will not easily be displaced. Indeed, the trouble is that they are over-crowded, and Mr. Alderman O'Brien has pointed out that what is urgently needed is some provision for the future increasing wants of the city. The horse-railroad companies may introduce the "circuit" plan, and put on a car with power, making up short trains of horse-cars, say four or six, for the route through Cornhill, Washington, Boylston, and Tremont streets, to Cornhill again; taking on cars along the route without horses, and leaving cars to be taken by the horses. The trains would stop only at given points, as is now the rule on Tremont Street from Boylston to Winter Street. Six cars, say, with one horse to soothe his brother (and sister) equines, and move the switches, and auxiliary steam-power, would occupy about the space of four cars and the horses. As the train of horse-cars would pass a given point only one-sixth as frequently as the horse-cars now do (passing the Old South once in three minutes), it would be very much less interruption to travel than at present.

Boston and Maine Elevated Extension.

The Boston and Maine Railroad boldly took the initiative, and applied to the Legislature of last year for powers to build an elevated railroad from Mystic River to Haymarket Square for passengers, proposing to give up all its surface facilities to the freight and express business. Would it not be much better to have a tunnel? This would bring the Boston and Maine into harmony with the idea of a tunnel across Boston. And is not a tunnel better than an elevated railway for various reasons?

First, The cost would be no more.

Second, The tunnel would be of slight expense for renewals and repairs.

Third, It could be lighted with ample ventilators and electric lights.

Fourth, It would be solid, and below the reach of frost and snow.

Fifth, At present, passengers in taking or leaving a train step up or down four feet, the height of the car floor above the track or street level.

With an elevated railroad, the car floor could not be less than thirty feet above the street level, or twenty-six feet additional of ascent and descent. With a tunnel, the car floor need be but eleven feet below the street level, or seven feet additional of ascent or descent, — about one-fourth that of the elevated method. Passengers coming to the city would not be troubled by the seven feet additional ascent ; the ascents being chiefly in the morning, and immediately after leaving a comfortable seat. But if the elevated method were adopted, and the tired traveller at night must mount thirty feet after walking to the station, it will be likely to cause discontent ; and the railroad company must be prepared very soon for an imperative demand for steam elevators, which would be inconvenient as well as expensive.

Sixth, The crowning argument in favor of tunnels over elevated railroads is that steam-railroad equipment is becoming heavier year after year, and the heavy equipment gives the best results. If we must have in Boston railroads above the street level, they must be elevated street-railways rather than elevated steam-railroads in the sense of lightness of equipment and moderate speed. In other words, the cars should be as light as is compatible with safety. The speed need not be more than twelve miles per hour, which is the average of the New York elevated roads. But is it wise to attempt to perch heavy locomotives and tenders, weighing seventy-five tons, thirty or forty feet above the streets? Ten years hence, steam-railroad equipment may be very much heavier even than this. Steam-cars are now constructed in width upon measures determined as best for ordinary vehicles centuries ago. The same measure practically determines the height, because railway equipment is as high (fourteen feet) as the base, the width of the track (about five feet outside), will safely allow. The present locomotive is so narrow that it offers the most dangerous position on the train to those who alone can be intrusted with the duties of pilot and driver. They are placed in a veritable sweat-box, or smoke-box, or smut-box, of limited dimensions; in striking contrast with the position held by pilots of steamships or the engineers of stationary or marine engines. Railroad men have exhausted every available means of extending their trains except by increasing their length. Vessels have been increasing in capacity with due reference to proportion, — originally the length to breadth being three or four to one; while now the fastest steamers are about ten to one, which is excessive, — but a long railroad train is frequently one hundred times as long as it is broad. A long railroad train is of about the proportions of an arrow which, sent from a bow, will pass through a buffalo, while a bullet from a rifle will not; but no one would choose an arrow as a convenient or economical form for packing bulky material. The proportions of our railroad trains are wasteful in the extreme: and this, taken with the fact that a locomotive yields only four or six per cent of useful result for the fuel consumed, shows the need of something better; which may be equipment twenty or thirty feet wide, and covering two tracks or the four rails of a double track, and perhaps twenty or twenty-five feet high. Such a loaded car or an engine might weigh two hundred tons, which is a small weight compared with a vessel, and insignificant compared with the

steamships which Capt. Eads proposes to transport by railway over the Isthmus of Tehuantepec. It is obvious that elevated railroads strong enough to meet the reasonable possible increase of weight of our steam-railroad equipment within ten or twenty years must be very heavy, and correspondingly expensive; while tunnels will receive bodies of almost unlimited weight, without large corresponding cost.

Tunnels.

Tunnels are evidences of the higher grade of railroad engineering. Does a railway engineer prefer a bridge, or an embankment? If he can fill a bridge, does he not invariably do it? The elevated railroad is a road all bridges : a tunnel is all embankment. There are great objections to the New York elevated railroads, and it may prove that tunnels would have been better ; but the Brooklyn Bridge certainly could have been abandoned eight years ago, for a tunnel, with great advantage. And this is undoubtedly true, although the attempt to tunnel the Hudson on the opposite side of the island at Jersey City has been attended with great difficulties from the nature of the soil. Telegraph-wires, too, which it is found at first easier to have upon poles, have ultimately to be put into tubes in the ground, which are small tunnels.

In a certain sense, tunnels may be regarded as luxuries which Europe has been able to enjoy to a greater extent than America, because of greater capital and denser population ; and rich and populous Massachusetts, than the other States. A tunnel is a *covered* way ; and the time may be coming when all our railways may be covered, and the pneumatic method of propulsion supersede the locomotive. We may well be proud of Hoosac Tunnel, the greatest railroad work in the country. Perhaps we can agree that it has been an expensive luxury, but undoubtedly for the coming century it will be pointed to as the grand pioneer of high railroad engineering in America. Europe has her great tunnels through mountains, and numberless smaller ones. The high ground upon which the chief residences of Liverpool are located is well honeycombed with railway tunnels. Perhaps the best known of English tunnels is the first Thames Tunnel, commenced in 1825, and opened in 1843, lingering along uncompleted precisely the same period as Bunker-hill Monument. During construction, the river broke through five times, twice causing loss of life. The cost was $2,500,000. A second Thames Tunnel, somewhat smaller than the first, but now in daily use for the transport of passengers in a car propelled by wire-cable at twopence (or four cents) each, was commenced and completed in the year 1869, without loss of life, cost $90,000, length 1,330 feet. One of these tunnels was built quickly and cheaply ; and the other took years and a vast amount of money, besides the loss of life. The two tunnels are under the same river, and only about a mile apart. Why the great difference? Chiefly this simple idea : to go deep enough, and select a soil that will stand up. Is it not likely that the clay of the East Boston and South Boston hills is to be found in the basin between, and for some distance up Charles River? This proves to be the case ; for Jan 14, 1836, Mr. Robert H. Eddy, the eminent patent solicitor of Boston, then a civil engineer, was

commissioned by Mayor Armstrong to survey Horn Pond in Woburn, and other ponds in that vicinity, as a source of water supply, before Lake Cochituate was determined upon. After completing the survey, Mr. Eddy conceived the idea of tunnelling Charles River, as the best method of laying the water-pipes.[1] He made soundings, finding clay, and reported the facts to Mayor Eliot March 1, 1838; which report was printed with copious references to the first Thames Tunnel, then in process of construction and personally visited by Mr. Eddy the following year 1839.

It would be no great expense to corroborate these investigations of forty-five years ago by a few small artesian borings about fifty feet deep, which would give all possible data for the successful prosecution of the work. The city of Boston has a great interest in this, for doubtless tunnels to East Boston and Charlestown would be cheaper and better than ferries or bridges. The citizens of East Boston have debated the advantages of ferries, — cheap ferry tickets, free ferries, and ferries with two or more landings on the Boston side; but good tunnels, neatly kept, with whitened walls and electric lights, will raise the price of land in East Boston, one dollar per foot. Ferries made East Boston, but tunnels are necessary for its full success. Ferries of three thousand miles are a great success, and East Boston has four of these; but ferries of three thousand feet or less are regarded as nuisances, — expensive and dangerous nuisances, — and avoided by the travelling public and those who cater to their tastes most successfully. The people of Charlestown have debated the subject of bridges for a long while and in a variety of forms; but have they considered that in about half of our weather, and almost invariably during the darker hours, the pedestrian will prefer the clean, light, and sheltered footpath of the tunnel to that of the bridge? The question of the ultimate economy of tunnels, over ferries and bridges, is one that should be considered by our retrenching officials, both State and municipal. Tunnels can be demonstrated to be economical thoroughfares, if the money to bore them can be borrowed at four per cent interest.

It may be said that this Boston Tunnel, with possible extensions to Mystic River and East Boston, is

[1] "I have found several — one gentleman in particular — who will readily undertake to build the wells and gallery (small tunnel six feet internal diameter, built in excavation nine feet in diameter) for $60,000. . . . By careful soundings made near Warren Bridge, at fifty feet apart, the rod near Charlestown side struck hard blue clay in five feet below low-water mark, after passing through two feet of mud. At four hundred and fifty feet farther, the clay was reached in twenty-five feet below low-water mark, the rod passing through one foot of mud. Between the draw and Boston abutment, at a distance of three hundred feet from the point last mentioned, the clay was reached at thirty-four feet four inches below low-water mark, the rod passing through nine feet of mud. At two hundred and fifty feet farther, it touched clay twenty-eight feet below low water, after penetrating two feet of loose gravel. At Boston shore, one hundred and fifty feet farther distant, the clay was found at twenty-five feet, with a stratum of mud fifteen feet over the same. The whole distance across the river is about fourteen hundred feet." This tunnel was to be for "two trains of water-pipes of twenty-two inches diameter, a main gas-pipe for lighting Charlestown from the Boston gas-works, and sufficient space for workmen to pass throughout the same at any time for the purpose of repairing or examining the pipes."

A Stupendous Scheme.

But it is no greater than several other schemes which have been successfully developed, as the railway system itself, the water-works, or the new public parks. Even if it were, is it not about time that Boston did some one really big thing? If it would maintain its prestige as the metropolis of New England, it must make ample provision for the responsibility. The writer spent the months of October and November, 1861, in London, when the Metropolitan Underground Railroad was building; and before his next visit, eight years later, not only was this completed, but the great Smithfield market was occupying the place of the cattle-pens which previously marked the spot where John Rogers was burned; the Thames embankment had been projected, and a part completed; while the Holborn Viaduct spanned the Holborn Valley, obviating the steep inclines of Holborn Hill and Skinner Street in one of the principal thoroughfares; and the Cannon-street, Ludgate-hill, and Charing-Cross stations had been built, and connected by noble bridges across the Thames with the railroads on the Surrey side, and delivering passengers at the very heart of London, almost within a stone's-throw of the Bank of England, St. Paul's Cathedral, and Trafalgar Square. Americans are too ready to think European cities are finished and unchanging; but any one studying the nature of the improvements named will see that each of them was an undertaking of very great magnitude and expense. And in Paris, Berlin, and Vienna, and other European capitals, extensive improvements are constantly being made.

The Eastern and Boston and Maine Railroads.

About fifty years ago, when the chief New England railroads were projected with Boston as a centre, one of the strongest organizations, which secured a loan of five hundred thousand dollars from the State of Massachusetts at five per cent interest, was the Eastern Railroad Company. The road commenced at East Boston (connecting with the city by ferry), and passed through the wealthy and populous seaboard towns of Lynn, Salem, Ipswich, and Newburyport, — the most favored line in the State. About the same time another movement, perhaps more pronouncedly for the through Eastern travel, was known as the Maine Extension, commencing at Wilmington on the Lowell Railroad (on the road-bed now used by the Lowell Company to Lawrence), and passing through Andover (a part of which is now Lawrence) and Haverhill to Exeter, N.H., a series of prosperous inland towns. Each road was pressing forward to gain ultimately the through business; and the Maine Railroad claims to have been in operation first, viz., as far as Andover. The Eastern, by connecting lines, gradually reached Portsmouth and Portland, the Boston and Maine joining at South Berwick, Me. The Lowell Railroad was said to be receiving forty thousand dollars a year from the Maine Railroad, but wanted more; and the Maine built a new line from Wilmington to Boston, through Reading and Malden, and, encouraging travel, soon built up along the line several thrifty villages. Another

grand stroke was securing the site in Haymarket Square, for the Lowell station of that day was not even up to Causeway Street. This made the Eastern Railroad managers feel the disadvantage of the ferry, for the Maine Railroad got two-thirds of the through travel. The Eastern Railroad was a few miles shorter, but that advantage was more than lost by the ferry. Many were the schemes devised to overcome the difficulty. A plan of ferrying the cars was feebly suggested, but instantly frowned down as a foolish and unheard-of novelty, though afterwards found valuable as a temporary expedient elsewhere. In an evil hour it was decided to build around Chelsea and Charlestown, and enter Boston as at present; though an elevated railroad was at that time proposed, and estates were scheduled for the purpose as far as Market Street on the west side of the Haymarket-square station. Various small rivalries existed at different times between these two roads; and in 1872–73 a great struggle took place for the control of the Maine business, and the Boston and Maine Railroad built an independent line from South Berwick to Portland at large expense, while the Eastern became involved in difficulties of such magnitude that it may be they can only be remedied by a complete union with the Maine Railroad.

The Lowell Railroad.

The prosperity attending the establishment of the city of Lowell soon made it apparent that the Middlesex Canal was quite insufficient as a means of communication with Boston; and the Lowell Railroad was one of the first to be completed, having the advantage of a considerable population at a distance of only twenty-six miles from Boston, and with many prosperous towns in New Hampshire not far beyond beckoning on to a great through business with Canada and the West. This has been a very prosperous road, but has been hampered in making its connections through New Hampshire, and of late years has borne the burden of a large and costly station intended to accommodate the Eastern Railroad as well; and thereby hangs a tale of wasted opportunities. The Lowell Railroad now suffers from low rates in its through business, but otherwise is gradually gaining its old prosperity.

The Albany Railroad.

This was first known from it eastern portion as the Worcester Railroad; that town fifty years ago having the enterprise to offer encouragement to the railroad which was refused by the neighboring town of Grafton, then of greater population. This road has always had the advantage of valuable connections to the city of New York and the West; but in 1836 Gov. Edward Everett truly represented the wisdom of the period by suggesting that horses would be sufficient power west of Springfield. We should bear in mind, that in those early days the Baltimore and Ohio and part of the present New York Central were horse-railroads. The traffic of this road assumes colossal proportions in its long-distance business; but it will also provide fine accommodations for its local travel, notably in the "Newton circuit." Some years ago the Albany Railroad

purchased the Grand Junction Railroad, which is practically a branch nine miles long to East Boston, where an immense grain business is transacted.

The Providence Railroad.

This is also one of the earliest railroads, with valuable and long-established connections, by boat and rail, to New-York City. Having for termini the first and second cities in New England, this company has, to a remarkable extent, adhered to its original business, and has always been known as a safe and prosperous road. Several years ago it catered to the wants of its local travel to the extent of laying a third rail seven miles out from Boston, upon which hourly trains are run; and this year it offers its patrons within five miles five-cent fares to Boston.

The Old Colony Railroad.

This was a later-built road, and not having the advantage of the original "boom," met, in its early history, peculiar difficulties. But now the Old Colony is a very *broad* railroad, if we speak of the territory served by its tracks, the length of which is greater than any other railroad in the State. It has important connections for passengers and freight to New York by boat, while it controls the seaboard business of south-eastern Massachusetts. Its tracks run north to Lowell; west and north to Fitchburg; south, east, and north to Provincetown; and south to Plymouth, New Bedford, Fall River, and Newport. The Old Colony Railroad also owns and operates the Union Freight Railroad in Boston, which connects all the railroads.

The Fitchburg Railroad. — The Hoosac Tunnel Route.

This road, like the Old Colony, was built without the advantage of the first demand for railroads, about 1830, having been completed to Fitchburg about 1846. It has not even had the advantage of large towns along its line, but has almost had to create the population it serves. It has been chiefly a freight road, bringing, up to the time of the completion of the tunnel, through Rutland, Vt., great quantities of Western products at low rates, to compete with the Albany Railroad. This has been accomplished only by the strictest economy; but the road has been well managed from the first, and has been uniformly prosperous, — as a striking indication of which it may be mentioned that $400,000 of a recent five per cent loan was taken at 112. But one grand purpose of its founders — the Hoosac Tunnel — has been accomplished, with the aid of great expenditure by the State of Massachusetts; and this line is one of the great through lines across the continent, and in Boston has ample terminal facilities for freight. It has a good local travel to Concord and Waltham, the latter town being also connected with Boston by a branch of this road through Watertown.

New York and New England Railroad.

The latest of our long railways is the present New York and New England, with connections not only to New York City by boat and rail, but to

Providence, Worcester, Springfield, and Hartford, and to the West, connecting with the Erie Railroad at Newburgh, ferrying trains across the Hudson. This road is partly a single-track line; but its growth is rapid, and soon this disadvantage will be remedied. The managers are alive to local as well as through business, and offer five-cent fares for a distance of five miles from Boston The New England company contemplate an important connection with the Eastern Railroad by ferrying trains from South Boston to East Boston This will undoubtedly lead to a tunnel under the harbor, and direct connection of these two roads.

The Massachusetts Central Railroad.

This road appears to have been originated to give railroad accommodation to interior towns, considerably removed from Boston, by opening a new through line. It is now meeting with difficulties incident to a line partly constructed. This company has authority, under legislation of 1883, to build to the Hudson River, and to consolidate with any railroad in Massachusetts or New York. It is now being re-organized, and will doubtless be in operation this season.

The Boston, Revere Beach, and Lynn Railroad.

This is the baby railroad, almost as broad as it is long; fat, chubby, and saucy; evidently forgetting that if the Eastern and Boston and Maine railroads are united, the new corporation could swallow it as easily as one takes in a good-sized oyster. But the Revere Beach Railroad has already played an important part in our railroad economy, and will doubtless continue to do so. Its projectors wished a connection with the Eastern in 1873, for beach travel; but local business was not considered of much importance at that time, and the Eastern managers had other claims upon their attention. But when this company secured a connection in Lynn, they touched upon the vital point that the Eastern Railroad had always failed to give proper attention to its local travel; and, with their beach business, a very strong but little corporation has been created, which doubtless had better remain independent.

Free Passes.

Our indefatigable governor omitted in his inaugural the subject of servants of the State taking free passes from the railroads. It may be that this will be the subject of a special message, or possibly His Excellency is himself so much addicted to the use of free passes that he dare not allude to the abuse. It is said that His Excellency was recently riding on the Boston and Providence Railroad as if he had a free pass, — probably thought he had one, as he had so many, — and the wicked conductor made him pay his fare. But His Excellency should forget his personal weaknesses in his eagerness to serve the state, and have the courage to point out clearly that a *railroad committee* should not take free passes from the railroad managers who appear before them asking concessions from the people. It is certainly remarkable that His Excellency should have omitted to mention the abuse of free passes by the servants of the State

in his inaugural; and it may be noted that his partisans in the Legislature (reformers?) were all in favor of taking free passes when the subject was up for discussion a few years since.

The Union of Railroads.

There is a strong tendency among railroad men to consolidate, and perhaps the most important case of the kind now pending is that of the Eastern and Boston and Maine railroads. These two roads are so interlaced in their various connections, that union of some sort is a necessity. I have until recently steadily opposed any union between a corporation which has been prudently and honestly managed, and one that has suffered both from gross mismanagement and from being outrageously plundered; but after a careful examination of the case I have come to the conclusion that the proposed lease of the Eastern Railroad for the term of fifty-five years, by the Boston and Maine Railroad, is a step that may be safely taken for the good of all the parties, not by any means forgetting the public.

Hoosac Tunnel and Boston Tunnel.

In proposing a tunnel through Boston, we cannot avoid comparisons with the tunnel through Hoosac Mountain, especially as the latter, after a period of ten years since its completion, again comes before the public with the statement that it cost twenty-two million dollars, or more than two hundred miles of ordinary railroad (eleven millions for actual cost, and eleven millions for politics, as the genial chairman of the railroad commission has stated it), and must be sold for a fraction of the cost. Doubtless the various railroads needing the tunnel for their through business will soon be consolidated into one through line, and Hoosac Tunnel be simply a piece of railroad property, and wholly disappear from the vision of politicians. But the ghost of this "great bore" must not be allowed to hover over every other tunnel that may be proposed. Boston Tunnel is for the people of Boston and vicinity more than for all others. Trunk line competition or "pools" can have no controlling influence over it. If the people who want to be conveyed cheaply and quickly from their homes to their business, and *vice versa*, will give it their support, and help get the support of those with whom they deal, Boston Tunnel can be built with all the economy and despatch which marked the progress of the second Thames Tunnel.

I do not present these suggestions without some opportunities for studying the subject in hand. My ancestors were among those who enjoyed the "carrying trade" of Europe during the Napoleonic wars, a part of their profits being a French claim which after several years they were fortunate enough to collect. Almost fifty years ago my father removed his family from Utica, N.Y., to Eastern Massachusetts, by canal to Schenectady, by railroad to Albany, and by stage through Massachusetts. A few years later a near relative of mine lost his life by the burning of the steamboat "Lexington" with nearly every person on board, on Long Island Sound, Jan. 12, 1840. He had considerable property on the steamer,

which caused a suit lasting twenty years; but the money was finally collected. The incidents of that journey and that terrible disaster long remained among our family traditions, abounding in comparisons of the four systems for passenger transportation. Later a practical connection with railroads, and family alliances in the vicinity of New York, and a residence in Liverpool and Manchester (soon to be connected by a grand ship-canal, making, say twenty-five years hence, one great commercial and manufacturing city thirty miles long, and doubtless the most populous in the world), have given me the opportunity to know personally some of the world's great carriers of the present day. I have some acquaintance with other cities, but I prefer to reside in or near Boston; and nothing would gratify me more than to see her enjoying the finest railway system in the world. If in the past I have spoken sharply, and indulged in plain talk, it has been without ill-will; and I am happy in the belief that it has done some good.

The canal and stage-coach are ancient methods. The railway and steamship are modern inventions, both of them having been only three-quarters of a century in existence; but is not the locomotive to-day more efficient as an agent of civilization than the printing-press? The State of New York has recently voted to make the Erie Canal a free public highway; but when the railroad becomes a free public highway, and the owner of suitable equipment can use the railroads under prescribed rules, without expense, the present advantage which the railroad has for passengers over canals and stage-coaches will then apply to freight, and the Erie Canal will meet the fate which overtook our Middlesex Canal almost fifty years ago. The railroad may not be able to compete with water transportation like that of the Ohio and Mississippi rivers, upon which it is said that a ton of coal may be transported from Pittsburg to the Gulf of Mexico, twenty-five hundred miles, for a dollar and thirty cents, or a trifle more than half a mill per ton per mile. But yet who can set the limit of cost of steam transportation by rail down the same grade that these rivers flow, with absolutely no cost except such as pertains to vessels floating down with the current? If every economy is practised, it may prove that transportation by land is both cheaper and quicker than by water!

Human Nature.

It is safe to assume that finally every thing resolves into a question of human nature. When we compare the English railway mechanics or "railway servants," with American mechanics or "railroad employees," we can see how English human nature is impressed on the English railways. The English mechanic is skilful, but he feels the full weight of ancient methods and customs. He is, however, progressive, and has learned that "in union there is strength." The English artisans are making rapid progress; and, not having the craze for political office which seizes almost every progressive American mechanic who might render great service to his fellows, they are making the most of their opportunities. Yet human nature crops out; and the enterprising Englishman looks forward to £. *s. d.*, as the only ground upon which he can

command respect. The English "railway servant" holds a lower moral and social position than railway employees in America; but these classes in both countries are making great advances, showing that if railroad service makes great demands upon the better qualities of human nature, it also does much to draw them out In no other employment do so many men co-operate with such precision to produce a given result, and the call is always loud for better men. A sound policy will give them a proper reward, and an opportunity to secure for themselves the best results of their efforts. Our railroad companies very properly demand strictly temperate habits on the part of their employees, but the demand is not always enforced; and we trust they are equally careful to insist that all restaurants at stations are also conducted upon the same strict temperance principles, which, we are sorry to say, is not in every instance the case.

The English railway managers are men of enterprise and spirit, well educated, and thorough gentlemen. I take Samuel Smiles as the best type, as I met him in London in the full vigor of maturity, more than a score of years ago. Like American railway managers, they are little given to seeking political distinction. They put their souls into their business, and work with a will, but commonly do not overwork. An American "railway king" will make a comparatively trifling capital build a thin and poor line of railway miles and miles into an uninhabited country, carrying the population as he goes: gradually making his road better, he realizes, if successful, an immense profit. The English railway manager can do nothing without a large capital, and it must be most carefully expended; but he pays only a low rate of interest. He has no unpopulated territory. Even in rural districts he must take fertile land, charged with the highest rent that near and good markets will enable a farmer to pay. But his strong point is to secure a good location in the cities or great English towns. He will bore tunnels, and build viaducts (as high as the tops of the houses) and costly bridges. He builds solid stations, and very properly calls his road the permanent way. He goes to the heart of cities, not excepting London, with a vigor that does credit to his sincerity. Now, is it not precisely this spirit that is needed, backed with ample capital at low interest, to build a Boston Tunnel, and connect it by rail with every town and hamlet in New England?

(Dec., 1888, 20,000)

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